

- (g) Lines plan.
- (h) Booklet of offsets.
- (i) Capacity plans for tanks
- (j) Construction plans showing measurements and scantlings of hull and superstructure.
- (k) Tonnage drawing showing tonnage length in profile and tonnage sections.
- (l) Arrangement plans.

[CGD 87-015b, 54 FR 37657, Sept. 12, 1989, as amended by CGD 95-014, 60 FR 31606, June 15, 1995]

§ 69.107 Gross and net tonnages.

(a) Gross tonnage is the sum of the following tonnages, less certain spaces exempt under § 69.117:

- (1) Under-deck tonnage (§ 69.109).
 - (2) Between-deck tonnage (§ 69.111).
 - (3) Superstructure tonnage (§ 69.113).
 - (4) Excess hatchway tonnage (§ 69.115(c)).
 - (5) Tonnage of framed-in propelling machinery spaces included in calculating gross tonnage (§ 69.121(d)(1)).
- (b) Net tonnage is gross tonnage less deductions under §§ 69.119 and 69.121.

§ 69.109 Under-deck tonnage.

(a) *Defined.* "Under-deck tonnage" means the tonnage of the space below the line of the tonnage deck, as that volume is calculated under this section.

(b) *Method of calculating tonnage.* Under-deck tonnage is calculated by applying Simpson's first rule using the tonnage length and the areas of the transverse sections prescribed by this section.

(c) *Identifying the tonnage deck.* In vessels with two or less decks, the tonnage deck is the uppermost complete deck. In vessels with more than two decks, the tonnage deck is the second deck from the keel as determined in paragraph (d) of this section.

(d) *Enumerating the decks to identify the second deck from the keel.* Only decks without openings that permit space below to be exempt from inclusion in under-deck tonnage are enumerated. Partial decks are not considered decks for the purpose of enumerating decks. However, the presence of engine and boiler casings, peak tanks, or cofferdams that penetrate a deck do

not disqualify the deck from being enumerated.

(e) *Identifying the line of the tonnage deck.* (1) If the tonnage deck runs in a continuous line from stem to stern, the line of the tonnage deck is the longitudinal line at the underside of the tonnage deck.

(2) If the tonnage deck runs at different levels from stem to stern, the line of the tonnage deck is the longitudinal line of the underside of the lowest portion of that deck parallel with the upper portions of that deck. (See § 69.123, figures 1 and 2.) Spaces between the line of the tonnage deck and the higher portions of that deck are not included in under-deck tonnage.

(f) *Tonnage length.* (1) "Tonnage length" means the length of a horizontal straight line measured at the centerline of the vessel from the point forward where the line of the tonnage deck intersects the line of the inboard faces of the ordinary side frames to the point aft where the line of the tonnage deck intersects the inboard face of the transom frames or cant frames. (See § 69.123, figure 3.)

(2) For a vessel having a headblock or square end with framing which extends from the tonnage deck to the bottom of the vessel, the tonnage length terminates on the inboard face of the headblock or end framing. When a headblock extends inboard past the face of the end side frames or when the headblock plates are excessive in length, the tonnage length terminates at the extreme end of the vessel less a distance equal to the thickness of an ordinary side frame and shell plating. (See § 69.123, figure 4.)

(3) For a vessel having a square bow or stern and tonnage deck with camber, the effect of the camber on the tonnage length must be considered. The tonnage length must be measured below the tonnage deck at a distance equal to one-third of round camber and one-half of straight pitch camber.

(g) *Division of vessel into transverse sections.* (1) Except as under paragraph (m)(1)(iii) of this section, the tonnage length is divided into an even number of equal parts as indicated in the following table:

Class	Tonnage length	Divisions
1	50 ft. or less	6
2	Over 50 ft. but not exceeding 100 ft.	8
3	Over 100 ft. but not exceeding 150 ft.	10
4	Over 150 ft. but not exceeding 200 ft.	12
5	Over 200 ft. but not exceeding 250 ft.	14
6	Over 250 ft.	16

(2) Transverse sections are cut at each end of the tonnage length and at each point of division of the tonnage length. Intervals and one-third intervals between the points of division are measured to the nearest thousandth of a foot. (See § 69.123 figures 5 and 6.)

(h) *Depths of transverse sections.* (1) Transverse section depths are measured at each point of division of the tonnage length at the centerline of the vessel from a point below the line of the tonnage deck equal to one-third of the camber or to one-half of the pitch of the beam down to the upper side of the ordinary frames, floors, longitudinal, or tank top of a cellular double bottom, as the case may be.

(2) When a depth falls at a point where the tank top of a double bottom has a straight fall from centerline to the wings, the depth terminates at one-half of the height of fall. (See § 69.123 figure 8.)

(3) When a depth falls at a point where the tank top of a double bottom rises from the centerline to the wings, the depth terminates at one-half the dead rise. (See § 69.123, figure 9.)

(4) The depth at the midpoint of the tonnage length or, when a vessel is measured in parts, the depth at the midpoint of each part determines the number of equal parts into which each depth is divided, as follows:

(i) If the midpoint depth is 16 feet or less, each depth is divided into four equal parts. If the midpoint depth exceeds 16 feet, each depth is divided into six equal parts. (See § 69.123, figure 7.)

(ii) The interval between the points of division of a depth and one-third intervals are carried to the nearest hundredth of a foot.

(i) *Breadths of transverse sections.* (1) Transverse section breadths are measured horizontally at each point of division of each depth and also at the upper and lower points of each depth.

Breadths are measured to the inboard face of the ordinary frames or to the line of the ordinary frames. Breadths are measured parallel to each other and at right angle to the vessel's centerline. (See § 69.123, figure 7.)

(2) Upper breadths are not reduced by measuring to deck-beam brackets. In cases of camber when an upper breadth passes through the deck (see § 69.123, figure 7), the breadth is measured to the line of the side frames at the under side of the deck projected vertically up to the height of the upper breadth.

(3) Bottom breadths are measured only as far as the flat of the floor extends. (See § 69.123, figures 7 and 10.) When bottom frames rise immediately from the flat keel, bottom breadths are equal to the breadth of the flat keel. Where there is no double bottom and where there is dead rise of the bottom out to the sides of the vessel, bottom breadths are equal to the part of the bottom plating not affected by dead rise.

(4) Bottom breadths falling in way of a double bottom, the top of which rises or falls from centerline to the wings, are measured between the inboard faces of the frame brackets which connect the double bottom with the frames. (See § 69.123, figures 8 and 9.)

(j) *Measuring spaces having ceiling.* The maximum allowance for terminating measurements on ceiling is three inches on the bottom frames or tank top and three inches on each side frame. When ceiling is less than three inches thick, only the actual thickness is allowed. When ceiling is fitted on a platform directly above the bottom frames, depths are measured down through the platform to the upper side of the frames and the allowable ceiling on the platform is then deducted.

(k) *Area of transverse sections.* (1) A transverse section at an end of the tonnage length may not yield area, except in vessels (such as barges) with an upright bow or stern.

(2) The breadths of each transverse section are numbered from above, the upper being "1", the second down being "2", and so on to the lowest.

(3) Multiply the even numbered breadths by four and the odd numbered breadths by two, except for the first

and last breadths, which are multiplied by one.

(4) Add together the products from paragraph (k)(3) of this section.

(5) Multiply the sum from paragraph (k)(4) of this section by one-third of the interval between the breadths. The product is the area of the transverse section.

(l) *Tonnage.* (1) Number the transverse sections successively "1", "2", and so forth, beginning at the bow.

(2) Multiply the area of the even numbered sections by four and the area of the odd numbered sections by two, except the first and last sections, which are multiplied by one.

(3) Add together the products from paragraph (l)(2) of this section and multiply the sum by one-third of the interval between the sections. The product is the volume under-deck.

(4) The volume under-deck is divided by 100 and is, subject to exemptions, the under-deck tonnage.

(m) *Steps in double bottom.* (1) The tonnage length of a vessel having a step exceeding six inches in height in its double bottom is divided into longitudinal parts at the step. Each part is subdivided as follows to determine the number of transverse sections:

(i) Parts 20 feet or under in length are divided into two equal parts.

(ii) Parts over 20 feet and under 40 feet in length are divided into four equal parts.

(iii) Parts 40 feet or over are divided as provided in paragraph (g)(1) of this section.

(2) The tonnage of each part is calculated separately. The sum of the tonnages of the parts is the under-deck tonnage.

(n) *Outside shaft tunnel exclusion.* Any portion of an outside shaft tunnel included in tonnage through the process of measurement is subtracted from the under-deck tonnage.

(o) *Open vessels.* (1) An open vessel is one of any length without a deck or with one or more partial decks, the total length of which is less than one-half the tonnage length.

(2) The line of the tonnage deck for an open vessel is the upper edge of the upper strake. Depths of transverse sections are taken from this line.

(3) Any vessel, other than one having a mechanically refrigerated hold, that is not an open vessel and that has a tonnage length of less than 50 feet is measured as an open vessel, if the distance between the line of its tonnage deck and the upper edge of the upper strake is more than one-sixth of the midship depth. "Midship depth" means the depth measured from the line of the upper edge of the upper strake to the point in the bottom used for measuring tonnage depths.

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§ 69.111 Between-deck tonnage.

(a) *Defined.* "Between-deck tonnage" means the tonnage of the space above the line of the tonnage deck and below the line of the uppermost complete deck.

(b) *Identifying the line of the uppermost complete deck.* (1) If the uppermost complete deck runs in a continuous line from stem to stern, the line of the uppermost complete deck is the longitudinal line of the underside of the uppermost complete deck.

(2) If the uppermost complete deck runs at different levels from stem to stern, the line of the uppermost complete deck is the longitudinal line of the underside of the lowest portion of that deck parallel with the upper portions of that deck. Spaces between the line of the uppermost complete deck and the higher portions of the deck are included in superstructure tonnage.

(c) *Method for calculating tonnage.* The tonnage of each level of the between-deck space is calculated separately, as follows:

(1) The length of each level is measured at the mid-height between the line of the deck above and the line of the deck below. Measure from the point forward where the continuation of the line of the inboard face of the normal side frames intersects the center line of the vessel aft to the forward face of the normal transom framing.

(2) Divide the length under paragraph (c)(1) of this section into the same number of equal parts into which the tonnage length is divided under § 69.109(g)(1).

(3) Measure at mid-height between the faces of the normal side frames the